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A set of guidelines designed to assist local superintendents with school plant planning. The historical background of the subject is briefly mentioned then the school program, administration of the school plant program, plant survey and the preparation of educational specifications are discussed. Selection and purchase of school sites are gone into as are architectural services and financing the building program. Construction, legal authority, furniture and equipment, heating, lighting and insurance are likewise discussed. The final chapter contains rules, regulations and standards applicable to the State of Tennessee. (NI)

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MANUAL
FOR
SCHOOL ADMINISTRATORS
ON
SCHOOL PLANT PLANNING

1796

TENNESSEE STATE DEPARTMENT OF EDUCATION
J. H. WARF, COMMISSIONER

FOREWORD

The school plant is recognized as being more important than ever before in the total operation of an educational program. Because of the importance of a functional school plant, the superintendents of schools in Tennessee have for many years expressed a need for a guide for planning school plants. This need is especially evident in view of the changing concepts and educational requirements affecting buildings and equipment, and because of the number of new superintendents assuming responsibilities for providing school plants which will more adequately implement a program of quality education.

In an effort to provide each superintendent and member of his staff with basic guidelines for planning a building program, the Superintendents' Study Council requested the committee on Buildings and Transportation to prepare an instrument which deals with some of the fundamental problems in this area.

In 1961 the Committee initiated plans which led to this publication. The manual includes some basic principles and considerations in school plant planning along with State laws and State Board Rules and Regulations.

This document is another of a series of similar cooperative studies undertaken by the Superintendents' Study Council. It should be a valuable aid to school administrators for planning more functional school plants with an environment for maximum teaching and learning.

We appreciate the efforts of the Building and Transportation Committee in the preparation of this manual.

J. H. Warf

Commissioner

ACKNOWLEDGEMENT

This manual is a result of direct and indirect contributions from many people. The members of the Building and Transportation Committee gave freely of their time and ideas to make this publication a reality. Appreciation is expressed to the Committee and to others who contributed to what is believed to be an invaluable guide to school plant planning.

The Committee wishes to give special recognition to the consultants from the State Department of Education for their time, experience, and contributions to the success of the guide.

The Committee is also indebted to Dr. John W. Gilliland, Professor of Education, and Director of the School Planning Laboratory, University of Tennessee, and to Dr. W. D. McClurkin, Director of Field Services, George Peabody College, for their time and valuable suggestions in the preparation of the manual.

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CHAPTER I

HISTORICAL BACKGROUND

School plant planning has made much progress in Tennessee beginning with the one-room log school through the period of the Rosenwald plan, and the use of stock plans, until today when well planned, designed, and equipped modern structures provide facilities for a controlled environment and for the implementation of the educational programs.

It was about 1895 when an occasional book concerning school plant planning appeared. Most of the material concerned with school building at that time was prepared by architects. Perhaps the major difference in the material written before 1900 and that of today is that today architects and school plant planners know better how to achieve the objectives desired.

Soon after 1900 the U. S. Office of Education added to its staff a school plant specialist who worked in the field assisting school people with the planning of facilities. In 1914 Julius Rosenwald announced that he would give aid toward the building of 100 rural Negro schools in the State of Alabama over a three year period. At the end of this three year period in 1917, a Julius Rosenwald Fund was incorporated for the main purpose of extending aid to other Southern states. The schools built under the Rosenwald plan proved to be much better than the schools of the past.

Nashville was selected as the center for administering grants and in 1920 the first Rosenwald school was built in Oklahoma. Soon after the construction of the first building all of the Southern states requested grants for building according to the Rosenwald plan. Because of the increase in interest it became necessary to more carefully prepare plans for the systems which were to receive Rosenwald funds. By 1925 it was determined by the sixteen Southern states that the Rosenwald plan was so much better than other rural school buildings, a need for school plant specialists in each of the Southern states was recognized. It was necessary to train personnel for these positions and the General Education Board in New York agreed to provide scholarship funds for the training, provided the various states would agree to employ the specialists upon the completion of their training period.

In 1929 the Tennessee State Department of Education employed a school plant specialist to assist local school systems with school plant planning. Since that time this service has been available upon request to all school systems throughout the State.

ORGANIZATIONS CONCERNED WITH SCHOOL PLANT PLANNING

The first organization for promoting school plant planning was the National Council on Schoolhouse Construction. This organization held its first meeting in 1922 and it has met annually since, except in 1924 and in 1944. The founders of this organization agreed that the primary purpose of such organization should be "to promote the establishment of reasonable standards for school buildings and equipment with due regard to economy of expenditure, dignity of design, utility of space, healthful conditions, and safety of human lives." The National Council publishes the

Guide for Planning School Plants which is invaluable as a resource for people who are engaged in school plant planning. Tennessee has been represented in the National Council since 1930.

In 1929 the Interstate School Building Service was organized at Peabody College. This group is composed of school plant personnel in the State Departments of Education in the Southern states. Its purpose is to exchange school plant information between the various state departments represented. This meeting is held annually at Peabody College and still confines its activities to school plant problems.

Another organization which has concerned itself with school plant problems is the Educational Facilities Laboratories, Inc. This organization was established by the Ford Foundation. The charter provides that it will perform the following general functions:

1. Foster, promote, and encourage improvements in the planning, construction, organization, equipping, and financing of educational facilities, public and private, at all levels.
2. Advance the study and public knowledge of the relevant research that already exists, and stimulate new research.
3. Collect and disseminate information relating to all aspects of education facility including the effect of physical factors on learning.
4. Build or otherwise establish and operate a center or centers for the development of plans, ideas, devices, and materials relating to the physical environment and the tools of instruction.
5. Solicit, accept, hold and administer funds for the above purposes.

The School Facilities Council which is supported by the manufacturers and suppliers of school equipment is another organization which is engaged in the improvement of school plant planning.

INTRODUCTION

In 1961 the School Plant and Transportation Committee of the Superintendent's Study Council expressed an interest in the need for guide lines for planning school plants. Because of the interest in this project the Committee asked for and received approval from the Superintendent's Study Council to engage in plans for the development of a handbook designed to assist local superintendents with school plant planning. It was the objective of the Committee to establish brief guide lines which should be especially helpful to new superintendents or those superintendents who may become engaged in school plant planning for the first time, as well as for those superintendents who have had some experience in school plant planning. Continued scientific progress and technological change is dependent upon the education of youth. As the education programs change school facilities must change.

Chapter topics selected by the Committee and which follow in this manual are considered the most essential elements in the planning of a school plant. While the information contained in this manual is not to be considered conclusive, an effort has been made by the Committee to provide answers to many school building problems which may arise from the time of the establishment of the need for a building to the time when the finished plant is put into use.

CHAPTER II

PLANNING THE SCHOOL PROGRAM

A. Some Local Educational Program Principles and Patterns that may Affect Planning

A well planned and appropriately equipped school building facilitates and embodies a spirit of learning. The school plant is considered a tool essential for the successful direction of learning and development. To accomplish such an environment involves the establishment of certain principles and patterns such as:

1. *The philosophy back of the local educational program*

The purposes of the program offered should be considered. This should be examined from the cultural aspects, vocational aims of its people, and the civic responsibilities expected of the youth who will be the future community leaders.

The nature of the educational program procedures should be studied. For example, will group or individual instruction be planned? What do the citizens of the community expect the schools to do for their children?

The social and political structure of the community must be carefully considered.

2. *The scope and organization of the school*

The grade organization must be determined before the program is planned. Special subject matter areas must be agreed upon.

B. The Educational Program

The school plant should be designed to fit the needs of the educational program. Therefore, "the most basic step in the process of planning a school plant is the determination of the character of the school program which is to be housed."[1]

Program considerations

1. *The scope and nature of the current curricular offerings:*
   - a. The arts (music and art)
   - b. Health and physical education
   - c. Language arts
   - d. Mathematics
   - e. Science and conservation
   - f. Social studies
   - g. Vocational education
2. *Discernible trends in each of these curricular offerings*
   - a. Increased emphasis on music and art in all grades
   - b. A well planned program of health instruction and physical education
   - c. Increased emphasis on modern foreign language with language laboratories as teaching and learning aids

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[1] *Guide for Planning School Plants.* National Council on Schoolhouse Construction, Nashville, Tennessee, 1958.

d. Introduction of new techniques in teaching mathematics with laboratories and equipment as teaching and learning aids

e. Greater emphasis on science, more equipment and supplies creating a need for more and larger storage areas

f. Increased use of maps, charts, and globes creating a need for more storage space and wall area

g. Shift in emphasis from agriculture to courses which prepare pupils for employment in business and industry

3. *Teaching methods as they may affect the program*

Consideration should be given to individual instruction, small group instruction, large group instruction, team teaching, and television as an aid to teaching and learning. Space needs may also be affected by decisions concerning group library teaching, independent study, use of audio visual centers as opposed to classroom use for audio visual aids, and physical education facilities for common use as opposed to separate facilities for each sex.

4. *Current and anticipated class loads*

"In grades 1-12, forty pupils in membership shall be the maximum size of class, except that in band, orchestra, chorus, glee clubs, and physical education the maximum size of class shall be 60 pupils."[2]

Consideration should be given to (1) the desired pupil-teacher ratio, (2) internal organization for instruction, (3) teaching methods and materials to be used, (4) health and safety, (5) school lunch services, and (6) physical education and social activities

C. The Community Education Program

1. *Predetermined size of school centers*

A considerable degree of uncertainty is inevitable in estimates of future enrollments. Sound procedures will help to arrive at a more accurate figure when planning a new school center.

Special consideration should be given to (1) site location and size, (2) pupil travel distance and method of transportation, and (3) special community services required such as student waiting centers and parks.

2. *Planned community use of school plant*

The degree to which a school plant is used by a community may depend a great deal upon the social customs, location of the plant, and other available facilities in the community. The introduction of air conditioning in school buildings has created greater interest in summer use of the school facilities, not only by the pupils but for adult use as well.

Some community activities and school site innovations which have implications for plant planning are (1) traditional summer school as well as adult use of facilities during the summer, (2) physical education both inside and outside the building, (3) community meetings, (4) library activities, and (5) adult classes. Some of the facilities which may be used by the community are (1) cafeteria,

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[2] 1963-65 Rules, Regulations, and Minimum Standards, Tennessee State Board of Education, Nashville, Tennessee, June 1963.

(2) clinic, (3) auditorium, (4) vocational shops, (5) library, (6) gymnasium, (7) laboratories, and (8) outdoor physical education facilities and parking area.

D. Some Criteria of Standards for Consideration

A school site which is to be used extensively for community use will need to be larger than a site which has relatively little community use. It is a general feeling that adults can use the regular school plant, provided the plant is designed for cooperative use.

Good preliminary planning can prevent excessive operating costs, as well as provide convenience which may not otherwise be provided. The following facilities should be included.

1. *Convenient access to the site, well planned drives, walks, and parking space.*
2. *Zoned heating and lighting so that after school activities will not require use of heat and lights for the entire building.*
3. *Toilet facilities and drinking facilities accessible to common areas.*

Area grouping or segregation of activities are essential to an effective program of community use of the school plant. Facilities for related activities should be grouped together and noise creating activities should be remotely located from those areas which are relatively free from noise.

CHAPTER III

ADMINISTRATION OF THE SCHOOL PLANT PROGRAM

A. Role of the Superintendent

The role of the superintendent in a school building program is not an easy task. He must present some well-defined needs, proposals for meeting the needs, and be able to surround himself with well qualified personnel to assist with the implementation of the program planned. A good superintendent will be able to recognize the potential contribution each person or group of people can make and must be able to coordinate the efforts into an acceptable plan. He should know and understand the community power structure. By virtue of his qualifications he should provide the community with educational leadership and advise the board of education on policy. He must be able to administer the policies adopted by the board.

The success of any superintendent may depend upon how well he accepts his responsibility relative to the following suggested guides:

1. Know the community, school, personnel, and recognize problems where they exist
2. Develop preliminary studies
3. Secure the complete cooperation and backing of the school board as soon as possible
4. Seek advice from professional people concerning a plan for organizing and conducting necessary studies
5. Adopt a schedule to follow and keep records of progress
6. Make careful preparation for any and all group meetings
7. Give careful attention to procedure; accumulate the facts and make them a part of the record
8. Organize a good plan for presenting program to the public. Present the problem before the solution is given
9. Be sure there is a complete understanding of the function and scope of different agencies: school board, school staff, architects, consultants, and lay committee
10. Carefully delegate the specific planning jobs
11. Analyze public opinions and decisions
12. Be prepared to generously share the credit for wise decisions
13. Forestall unwise decisions by allowing others time for deliberations

Good leadership is conducive to the forming of productive opinions. A well planned program of public relations is essential in keeping people informed as to the progress being made. Leaders of the social groups within a community will be better informed by good leadership from the superintendent, thus more cooperative and productive planning will result.

B. Role of the Board of Education

The basic role of the school board is to develop the policies necessary for the operation of the school system. Individual board members have no legal grounds for promises or action as individuals and should refrain from such promises outside board meetings. The board does have the legal rights and responsibilities as a body and all action must be taken in regular or called board meetings. The superintendent of schools should be recognized by the board as the educational leader and administrator of board policies. The board members should make decisions concerning policies and should make authorizations based on the recommendations of the superintendent.

Some duties of the board of education in a school building program are as follows:

1. Approve the scope of project and educational specifications
2. Make provision for legal counsel
3. Approve the capital improvement budget and financial plan
4. Authorize a bond election or other means of financing
5. Authorize a bond issue
6. Approve procedures for selecting architect and other specialists
7. Engage an architect and other specialist personnel
8. Establish procedure for site selection
9. Approve and purchase a site
10. Approve public relations program for project
11. Request approval of other agencies, if legally necessary
12. Approve plans for staff relationships during planning and construction
13. Approve preliminary drawings
14. Approve final plans and specifications, including method of receiving bids
15. Advertise for bids
16. Let construction contracts and provide protection for the school system
17. Provide for supervision and inspection of construction
18. Approve procedures for selecting furniture and equipment
19. Authorize purchase of furniture and equipment
20. Accept the building and other work
21. Approve payments
22. Approve policies governing occupancy and use of the building[3]

The board members should not get involved in the administrative or technical phase of the building program. The school administrator should in turn keep the board informed through all steps of the progress and should supplement details of his reports with opportunities for the board to observe both their own building progress and progress which other systems may be making on similar building plans.

C. Role of the Teaching Staff

The school administration should provide well qualified personnel who are dedicated to their responsibilities and who are capable of accomplishing the purposes of the schools. In order to accomplish this end it is essential that the staff be provided good buildings and equipment. The teaching personnel should be given an opportunity to express themselves as to what they consider essential in their work. Not only the present, but the future must be considered. Spaces must be so designed to facilitate change. The facilities designed for a staff today may not be like those needed by a future staff. After careful consideration of the needs, they should be met insofar as possible.

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[3] Strevell, Wallace H. and Arvid J. Burke, *Administration of the School Building Program*, McGraw-Hill Book Company, Inc., New York 1959, p. 59.

D. Role of the Lay Citizen

All communities have numerous private groups which have an interest in the education of their youth. Some of the groups are: parent-teacher organizations, womens clubs, business mens clubs, and chambers of commerce.

The organization may be able to help the board interpret needs for the plant outside the school. They may also inject some industrial or business opportunities and interests of the community not already included in the plant needs. The administrator should be careful to coordinate and direct the thinking of these groups so they will not become involved in ways to solve the problem, but will rely on the professional staff for this task.

E. Role of the State Department of Education

The staff of the State Department of Education stands ready and willing to assist local school systems with their school building problems. The State Department has two major functions: a leadership role, and a regulatory role. The school plant program has long been regarded as one of the areas in which controls, services, and leadership are needed at the State level, since school facilities and equipment play such an important part in pupil protection and education.[4]

Clearly defined and documented Rules and Regulations established by the State Board of Education are available for all superintendents and their staff. The State Department of Education has a responsibility for administering these regulations concerning attendance centers, school sites, new construction, major repairs of school buildings of a capital outlay nature, and equipment of school buildings.

The school plant division of the State Department of Education coordinates the school building planning services with the other divisions of the State Department of Education, and coordinates school building planning with other state agencies such as the Health Department, Division of Fire Prevention, and Planning Commission.

The State Department of Education has a responsibility to conduct surveys, to assist in planning long-range building programs, to assist in school plant administration and management, to assist in preparing educational specifications and to provide informational service in the school plant field.

The State Department has a responsibility for reviewing and approving all preliminary plans and outline specifications as well as final plans and specifications, a responsibility to meet with and assist local boards of education in planning, and assist superintendents and boards of education in county court meetings to explain building needs.

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[4] The Responsibilities of State Department of Education for Pupil Transportation Services and School Plant Services, The Council of Chief State School Officers, Washington, D. C., 1958, p. 44.

F. Role of the School Plant Specialist

The school plant specialist may be found in a local college, university, state department of education or he may have a consultant service as a private business or as a corporation.

His judgment is usually based on a wide experience in many different communities. He has the time to do research, can approach the problem in an impartial manner, and serve both the lay groups and the professional staff. He has the time to devote to the refinement of the most minute details concerning the building program.

PUBLIC RELATIONS

A. Public Participation

Develop Public Interest

The school building program, a tangible phase of the educational system, often becomes the center of public interest. The courses offered or the established budget may not be questioned, but interest, support, or opposition grows rapidly when a building program is proposed. Good public relations is probably one of the most vital needs for the successful planning and completion of facilities for an instructional program.

Public relations should be a continuing process and should be well established prior to the time a building program is needed. A close working relationship between public school officials and the citizens of a community creates an understanding of building needs and a realization of the importance of a well defined plan for meeting the need. Unless the citizens of a school system are informed as to the basic need a great deal of misunderstanding is likely to result. Some of the critical issues are: site acquisition, adoption of a budget, or approval by the people to borrow funds for construction.

Public Should be Invited

A sound public relations program requires broad public participation from the defining of the need, to proposing plans for meeting the needs and establishing priorities for the projects. An understanding of the total educational program is essential to good support of a building program. The well informed public will support the educators' plan for meeting community needs for the present and future.

Keeping Public Informed at all Stages

The average size school system will not have a continuous building program, but the large systems may never reach the end of a construction or modernization program. The citizens are entitled to know about their own schools. The following is a suggested list of topics of information for release to the citizens concerning school building progress.

Prior to a survey

1. Official reports on nature of school population
2. Reports on curricular offerings and school services
3. Reports on visitation to other school systems
4. Birth rate in community and its implications for future enrollments
5. School system evaluation
6. Unmet needs or services not being provided

During a survey

1. Overcrowded conditions in schools
2. Community factors that are changing
3. Shortcomings of existing plant
4. Estimates of school enrollment increases
5. Problems of school sites
6. Reports of public forums or civic groups considering school needs
7. Specialists employed by school board
8. Estimates of future space and facility demands

Public referendum or bond election

1. Proposals for meeting school plant requirements
2. Provisions for hearings
3. Basis for financial plan
4. Procedures of the election
5. Where to obtain information

Progress of the project

1. Bids and costs
2. Inspection of work
3. Plans for occupancy when completed
4. Dedication ceremony
5. Financial success of the project budget

Completion of the project

1. Educational services offered
2. Success of the pupils
3. Community use of school plant
4. Features of the new plant
5. Recognition of leadership[5]

A large scale building program may be spread out over a number of years. Special help may be needed with newspaper, radio, television, and leaflet advertising. Often those people who develop brief, factual and well-timed advertising materials are invaluable as far as their knowledge of the subject is concerned. The architect is usually able and willing to prepare brochures for distribution.

Reach all the Public

It is important to reach all the public; those interested in kindergarten, elementary grades, and high school, as well as those interested in organized sports, community use of the building, or those who have no children. Another person who must be kept informed is the absentee owner. Often times this individual may own a great deal of property and it becomes important to present to him fairly and accurately all proposals for improvements.

B. Referendums and Elections

The citizens are often called upon to vote on a bond issue for school construction. Even if the elected officials approve requests for financial aid, it is important to create public interest in and support for schools. This may be an opportunity to increase public knowledge both of financing and operating the schools.

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[5] Strevell and Burke. *Op. Cit.*, p. 349-350.

It is generally the responsibility of the superintendent and the board of education to prepare and present to the public information concerning the need for new school buildings. However, in reality the superintendent is in the position to initiate proper action backed with accurate and well documented data. When this has been done, the board of education should study very carefully the plan of action and assist in making the public aware of the proposed needs.

The report to the people should show: birth rate, community growth, enrollment projections, directional trends of growth, relationship between existing plant capacities and enrollments; spot maps showing location of children, topographical maps, road maps, prospective site locations, studies by other agencies, study of the type schools needed in relation to community development—industrial and agricultural, and a summary of proposed future needs.

School bond elections should be held separate from regular elections if possible. This procedure tends to remove non-educational issues from the objectives of the bond issue. Personal appearances in the school district by the superintendent, members of the board of education, and sometimes the architect and consultants exert a tremendous influence on gaining public support.

The superintendent and board of education should contact their legal advisors to gain a complete understanding, authorization and approval before proceeding with plans for gaining public support. Gaining support of state or other governmental agency requirements concerning bond issues provides opportunities for sound public relations. It is equally important to cooperate with other local agencies because of the continued need for community support for local projects other than the school systems. Each agency as well as the citizens in the community must recognize the importance of a cooperative attitude and plan together to exchange information wherever possible. One cannot exist without the other.

Progress Reports

Continuity in public relations is essential to a satisfied public. Data which interprets the building may be released through brochures, radio, newspaper or television and should help the public retain interest. The administrative areas, teaching space, equipment, lighting, ventilation, recreational facilities and other interesting details may be clearly, factually, and briefly interpreted to the citizens.

Traditionally, a completed school building is followed by a dedication ceremony which brings about a sense of public appreciation on the part of the citizens who cooperated to provide public funds to help make the building a reality. Obviously, to keep the citizens informed at all stages of a building program not only helps to make the program possible, but develops a cooperative attitude for maintenance and operation of the new buildings and encourages public support for future building programs.

CHAPTER IV

THE SCHOOL PLANT SURVEY

A. Board Evaluation and Approval of Survey Proposal and Plan

After the need for a building program has been recognized and the decision has been made to enter into such a program, the superintendent and board of education must determine the major steps to follow. The first of a series of steps is a school plant survey. "The school plant survey is a study designed to develop a master plan of future construction for an entire school district rather than a detailed plan of an individual building within the total program."[6] Following the building survey is the educational program planning, the architectural and engineering planning and the construction. There are four major methods of making surveys: (1) outside specialists, school leaders, and community leaders, (2) outside specialists and school leaders, (3) self survey by school leaders and community leaders, and (4) outside specialists.

Outside specialists, school leaders and community leaders working together should provide the best approach to problem solving. Local educators and lay citizens may learn more and become more enthusiastic about the educational needs if a self study is made, and an outside team will probably alert more people to their needs and to new ideas.

Outside surveys are usually conducted by various colleges and universities and by the State Department of Education. There is usually some expense involved if they are conducted by the colleges or universities, but the State Department of Education makes the service available to all school systems at no cost to the local citizens.

Local officials may determine that a more comprehensive survey is needed. A survey, or a total look at all phases of the educational operation, including pupil population projection, instructional program, school plant, transportation, teaching personnel, administration, and the financial condition of the system, should result in a more effective long-range building program.

B. Some Types of School Plant Surveys and the Manner in Which Developed

Surveys help to determine total plant needs based on pupil population by pre-school age, by grades, schools, areas within a system, and by systems. The existing school plants are examined in terms of their location, site size, school size, conditions in terms of safety, healthfulness, environment, future maintenance and operation costs, and ability to meet the present and future needs of the educational program and community use. If buildings are to be expanded or replaced, sites expanded, or locations for new sites are to be considered, the survey staff will need to analyze the school program before making a final determination as to the types and location of the facilities needed.

The surveys may be a continuing process to keep current with needs. They may be a part of a comprehensive survey, study of an individual school, an attendance area for a specific building program, or may be directed toward improvement of one or more existing buildings within a system.

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[6] National Council on Schoolhouse Construction, *Op. Cit.* p. 4.

C. School Population Data as Basis for Estimating School Plant Needs

Before any building program is needed there must be pupils present. The age and number will largely determine facilities needed. In taking a census the trend over a period of years must be determined, the number of pre-school age, number in each grade, total enrollment in the survey area, and the number of adults who are of child bearing age must be taken into consideration. The projection by age and grade groups must be made, trends by years established, and the survival rate from birth through the highest grade in the system must be determined.

Spot maps showing residence location of each child, location of streams, mountains, transportation routes, and industrial plants are needed to determine where buildings should be located.

Local officials are usually asked to cooperate with any outside survey team in the preparation of these spot maps. Road maps used for preparing spot maps can be obtained from the State Highway Department.

D. The Educational Program to be Housed

Any school plant is designed and provided only to serve the needs of the educational program and the community in which the plant is located. A long-range program should result in a better building program to meet these needs in the future.

Consideration should be given to grade organizations, for example, K-3, 1-6, 6-3-3, 6-6, 8-4. Some concept or a conviction as to what constitutes a good and adequate school as to size is essential. A continuous study of pupil personnel is needed. A study should be made of what happens to graduates, the occupational patterns in the community must be identified, a study of pupil achievement, rate of failures, college preparation, and those preparing for immediate employment from high school is essential. The number of dropouts and reasons for such action is needed. The holding power in any school or community must be determined.

From such studies decisions can be made relative to course offerings, class sizes, teaching methods, regular classrooms and special instructional areas needed, as well as administrative space and service areas necessary in all buildings.

The total building needs less capacities to be retained should result in the needs for the new building program. The survey report may show priorities for the program and the approximate amount of funds necessary to implement the recommendations.

The survey should answer such questions as: What are the total plant needs for both the present and foreseeable future? To what extent do existing plants meet needs of educational program and adults of community? What improvements are recommended? Are buildings properly located for future use?

It is highly inconceivable that all pupil population projections, site selections, and building needs will be completely accurate in the future because of population shifts and changes in curriculum. It is imperative that scientific methods be used by the survey team for the best possible educational environment to evolve. Survey teams are not infallible, and adjustments may be necessary. Continuous examination and study will be necessary as educational trends change.

The adoption of all or any part of the plan is the responsibility of the local board of education.

CHAPTER V

EDUCATIONAL SPECIFICATIONS

A. Responsibility of the School Administrator

One major aspect of the building program is the development of educational specifications to be used by the architect in designing the building. No architect should be asked to design a building until he has been given a written copy of the educational specifications. These specifications should show the educational philosophy of the school system, describe the scope and nature of the program to be housed, indicate grades to be served, list the facilities needed, indicate equipment needed in each type of instructional area, show the type furniture needed including teachers' desks and file cabinets, indicate chalkboard and tackboard needs for each area and possible locations of the instructional areas within the total plant. This information will not only show the architect what is needed, but should stimulate him to be creative in his planning and designing.

The preparation of educational specifications is essentially an instructional job and the superintendent and his staff should assume the responsibility for this preparation. They are the ones who are experienced and can identify the needs as to small or large group activities, individual study, class presentation, laboratory and lecture procedures, equipment and facility arrangements, or whether or not self-contained rooms are desired. The superintendent should coordinate the writing and determine, along with the staff members, the final specifications to be presented to the board of education for official action. The superintendent and his staff should be provided a conference room equipped with tables, chairs, bookshelves, and reference materials. This should be considered the work space for the writing of the educational specifications.

B. Responsibility of the Architect

While the architect may have a part in the selection of the site or in the preparation of educational specifications his major responsibility is concerned with design, building structure, economy, safety, durability, environmental factors, and aesthetics.

There may be occasions when it will be necessary to adjust his plan within the limitations of the established budget for the building program.

DETAILED INFORMATION NEEDED BY ARCHITECT

Organization of the school

1. Grades to be housed
2. Grouping of students
3. Long-range plans for use of school
4. Survey recommendations—if any

Financial Plan

1. Amount allowed for site, construction, equipment, and other items
2. State or Federal funds available
3. Amount of leeway on total budget

Site

1. Location, size, condition
2. Results of test borings
3. Walks, drives, parking needed
4. Physical education and play fields planned
5. Landscaping included in the plan

BUILDING FACILITIES PLANNED

Basic Considerations:

The number of regular classrooms, special rooms, laboratories, and shops should be indicated. The area for administrative space, gymnasium, auditorium, cafeteria, storage space, as well as requirements for heating, ventilation, air conditioning, sound control, lighting, and electrical outlets, should be shown. The design of the building helps determine the learning environment, and the performance of its occupants.

The total projections on the school site should be shown. The architect should know whether future buildings are planned for this site and if there are any foreseeable educational changes to be incorporated into the plan.

Educational specifications are performance goals and they should be prepared in a manner which will be helpful to the architect.

C. Procedures to Follow in Preparing Educational Specifications

Who should be involved?

1. Superintendent
2. Board of education
3. School staff
4. Educational consultants
5. Architect
6. Lay citizens

During the planning process the superintendent and his staff may find it helpful to consult with others in the equipment and design fileld of such service and special areas as: (1) laboratories, (2) shops, (3) kitchens, (4) foreign language laboratories, (5) music rooms, or (6) auditoriums.

SOME FACTORS WHICH GOVERN EDUCATIONAL SPACES

Class sizes:

Is the program to contain small groups and/or large group instruction?
Will primary grades be grouped within a classroom?
Is building to be planned for television teaching?

Enrollment by categories:

The school enrollment is usually divided by grade, subject, or department and the number of students in each can be invaluable in providing spaces accordingly.

Daily schedule

The schedule of activities in a given day or week can be helpful to plan for the building usage. A projection into the future may provide a visible trend valuable for future planning.

Flow of Pupil Traffic

Consideration should be given to class changes, obtaining materials and supplies, arrangement and rearrangement of furniture, visits to rest rooms, drinking fountains, and student lockers.

Equipment and furniture

Is equipment portable or fixed?
Are electrical outlets needed; if so, location of each?
Are equipment layouts considered for space requirements?

Functional Spaces Needed

Spaces for different kinds of activities in any given room are needed
Provide not only for present but future as well
Provide for school and community
Consider resource centers in total arrangement of instructional spaces
Adapt design to changing conditions and enrollments
Consider attitudes of children in total plan

Final Reports

Prepare charts, maps, and room layouts to emphasize needs. All facts, figures, recommendations, and conclusions should be presented in written form to the board of education. It must be pointed out that changes may be necessary as the architect develops the plans and specifications for the projects. It should also be emphasized, and caution exercised so as to avoid including anything in the educational specifications which might restrict the imagination and creativity of the architect.

CHAPTER VI

SCHOOL SITES—SELECTION AND PURCHASE

School site selection in Tennessee probably results in more local disagreement and awakens more local citizens than any other phase of a building program. Often times the failure to make long-range plans for new school sites and the refusal by local people to accept good sound educational principles concerning site selection leads to the acquisition of land which is both beyond the realm of financial reason and located away from the major student population, flow of traffic, and away from the apparent trend of population shift.

Site selection should be based on educational community-centered needs rather than individual-centered, private, and selfish interests.

A. Some Factors on Site Selection

The educational policies

1. School organization—K-3, 1-6, 6-3-3, 6-6, 8-4.
2. Established size of school—optimum size, minimum and/or maximum size

Type school to be housed

1. Primary unit only
3. Primary and elementary unit
4. Secondary unit

Community use of school site

1. Community library
2. Community center
3. Summer recreation activities
4. Used in relation to park systems

School population to be housed

1. Age levels to be accommodated
2. Population density
3. Area population trends must be determined with maps, use of Planning Commission data, and utility service projections
4. Population prediction

SITE ACCESSIBILITY AND TRAVEL REQUIREMENTS

The board of education should have definite policies relative to location of sites, travel distances and travel times as well as walking distance. Sites should be located near the center of the present population and should be located where the greatest number will walk the least distance and then move toward the probable future growth. The **Guide for Planning School Plants,** published by the National Council on Schoolhouse Construction recommends the following distances and travel time as reasonable maximums.

Distance	Elementary School	¾ mile
	Junior High School	1½ mile
	Senior High School	2 miles
Travel time	Elementary School	½ hour
	High School	1 hour

The Tennessee Law provides that no child shall be in transit longer than 1½ hours. The law further provides that local systems may participate in State transportation funds for any student transported who resides 1½ miles or more from school. Definite established policies may help to prevent future problems.

TRAFFIC FACILITIES AND PROBLEMS

1. Are streets and/or roads available?
2. Is public transportation available?

It is generally agreed that streets, roads and public transportation should be accessible but that the site should be located so it will not be close to noise and dangerous intersections. Traffic congestion should be avoided if possible. Barriers such as hills, streams, and inaccessible roads should be considered when locating sites. Hazards from busy thoroughfares, railroad crossings, hills, etc. should be guarded against wherever possible while locating sites.

Community Environment

1. Are the proposed sites located in a residential area away from noise, smoke and industrial distractions?
2. Are there possibilities of site beautification?
3. Are the proposed sites removed from air flight patterns?

Caution should be exercised in selecting a site. It should be conductive to healthful conditions both on the grounds and in the buildings.

Site availability, size, and shape

The site should be located where student growth is anticipated and where a minimum amount of overlapping of school attendance centers will be necessary. It should be placed so as to provide a forward flow of transportation toward high school centers as much as possible.

The site should be large enough to accommodate the present educational program and the anticipated future needs.

A good site is usually considered to be rectangular in shape with a ratio of approximately three by five. The building should be located on the site in a manner that will create a need for a minimum amount of drives and walks, and provide for a maximum amount of outdoor play and educational area.

The site should provide for good drainage but should not wash. It should be suitably located with good footings for the building, the soil and shape of the site should be such that excessive construction costs can be eliminated, and should provide for a minimum amount of maintenance.

The site should be located so that utilities such as water, sewage, and gas will be available wherever possible. If sewage connections are not possible, a satisfactory percolation test of the soil should be secured. In many areas, however, a sewage treatment plant is proving to be a more practical approach than a septic tank, which depends on good percolation for proper functioning.

B. A Suggested Criteria for Good School Sites

1. Ample size for present and future needs located in a desirable environment

2. Accessible to pupils and adults of the community
3. Shape—rectangular, compact
4. Adaptable to type of school to be operated, program to be offered, and plant to be erected
5. Away from objectionable industrial smoke, noises, noisy streets, roads, or railroads
6. Suitable soil, not too heavy, not too light
7. Enough slope for drainage, not inclined to wash, not too steep for playground
8. Accessible to public utilities, and sewers
9. Within reasonable travel distance of majority of students
10. Adaptable to plot planning, building location, playground, physical education area, walks, drives, and parking space

It has been said that seldom do you find window glass broken in a school where an attractive landscaping job has been done and where aesthetic surroundings are maintained. This type setting tends to develop a spirit of appreciation of beauty on the part of students.

C. Purchasing School Sites

Selection timing

Much progress has been made in recent years toward developing a cooperative approach to site selection and purchase. Contractors who are developing residential property on a large scale, as well as planning commissions, housing authorities, and other responsible agencies, are cooperating with boards of education in reserving school land within the areas being developed. This is a healthy development for a community because the timing of selection is very important. Even in rural areas early selection of land helps to reduce inflation possibilities, reduces pressure from those wanting to sell, provides site when needed, and facilitates long-range planning. When selecting sites, especially in rural areas, it is good to consider several sites before a final choice is made. This tends to reduce inflation chances.

Purchase procedures

There are three major ways to obtain school sites in Tennessee. They are as follows:

1. Accept as gift
2. Negotiations between school board and owner of land
3. Exercise right of eminent domain and condemn

It is more pleasant and usually less expensive when negotiations can transpire between the owner and school board in a businesslike manner. Caution should be exercised in receiving land as a gift. Too often the site is not suitable for school purposes or the person offering the donation is seeking a return favor. This is not always the case, however, but a careful analysis should be made before the school board accepts the donation.

Avoid condemnation to secure school sites whenever possible. It is a means of securing a school site, but usually results in bad public relations and loss of some community support of the school program. Secure a fee simple title to all sites. Avoid special interest groups and at no time should school board members or other school officials engage in transaction of personal property for school purposes.

CHAPTER VII

ARCHITECTURAL SERVICES

Once the need for a building program has been established and a determination made to enter into such program, procedures for selecting an architect should begin. The superintendent and school board should not proceed with plans without the help of the architect. His background and school design experience is invaluable in assisting with program planning and site selection.

A. Selecting an Architect

In 1950 the National Council on Schoolhouse Construction selected a committee to study and establish a guide for selecting an architect. A questionnaire was prepared by the committee and adopted by the council. It was then presented to the American Institute of Architects. Their organization accepted the plan and cooperated with the council in publishing the questionnaire.

This questionnaire may be obtained by writing to Dr. Floyd Parker, Secretary-Treasurer, National Council on Schoolhouse Construction, 409 Education Building, Michigan State University, East Lansing, Michigan. It provides a uniform means of securing information from the architects to be considered.

Membership in the American Institute of Architects is not a requirement to practice architecture, but boards of education should carefully consider the responsibilities and the task to be performed before selecting an architect who is not a member of the organization. Interviews with architects should be long enough to allow sufficient time for them to explain fully the quality of work which they perform.

After reviewing the questionnaires and interviewing the architects the superintendents and boards of education should visit some buildings designed and constructed by proposed architects. Some of the questions which may be asked are: (1) would the architect listen to the teachers?, (2) would he cooperate?, (3) How many change orders were required?, (4) how clear were his drawings? Change orders should not constitute more than 5% of total cost of construction excluding changes asked for by the board of education. Talk to people who are using the buildings, find out about the architect, his supervision during construction, the workmanship he demands, and form an opinion of each project. Only after this has been done should the board of education make a final decision as to the architect to employ. After a selection has been made the other architects who were interviewed should be notified of the board's action and thanked for their time and cooperation.

Architects are not permitted to advertise so they usually set aside five percent of their fees for promotion of their work.

If the board of education feels that they have an obligation to a local architect but generally feel that he would need some help it is suggested that the local architect be required to bring in a designated well known associate architect to assist with the project. He should be asked to help plan the building as well as approve the final plans.

The superintendent, board of education, and local citizens have a responsibility to provide information and help the architect to do the best job possible. Probably the most valuable expenditure that can be made on a school building is for the architect's fee.

B. Functions of the Architect

A good architect has creative ability, conception, technical knowledge, and the skill to accomplish the task before him. He must also be a good administrator, public relations man, and know how to work with engineers, and equipment suppliers as well as educators. The following is a list of detailed functions an architect must perform:

1. Study educational specifications and prepare preliminary sketches for the school board
2. Translate educational specifications into preliminary plans and outline specifications
3. Serve the superintendent and school board as a technical consultant on materials, design, construction, costs, etc.
4. Coordinate the work of the various designing engineers, construction, and materials areas
5. May provide and obtain consultant services
6. Prepare final drawings and specifications. The architect should be asked to indicate future additions with broken lines
7. Interpret drawings and specifications to school boards and prepare cost estimates
8. Act as technical advisor to contractors
9. Assist in awarding contracts, bonding, etc.
10. Supervise construction
11. Help check completed project
12. Assist educators who are to use the school with such items as illumination controls, operation of mechanical equipment such as temperature controls, heating and ventilating, communication system, and fire protection equipment. The superintendent, board, teachers and custodians should all be instructed as to the use of the equipment.
13. Assist the business office in setting up records of the building and equipment, and scheduling maintenance and custodial care of the entire plant.

The architect has a real opportunity for good public relations, both present and future, as well as a responsibility to finish the task for which he was employed.

C. Contract with the Architect

The contract between the board of education and the architect should contain all of the specific services that the architect is expected to perform. It should be clearly and legally stated and fully understood by all concerned. It should be equally binding on both parties and should be written so as to be executed fairly. The starting time and expected time of completion should be indicated, but the time schedule should be flexible.

The board of education is responsible for informing the designer of funds available for construction, for limiting the scope and construction type demands to those agreed to in the contract, for limiting changes that may increase costs without providing more funds, and for reviewing and approving final plans and specifications prior to advertising for bids.

Often times boards of education are concerned about the working relationships with an architect throughout a building program and the feeling of terminating a contract may exist. It is best to have a clear understanding and a method of termination agreeable to both parties written into the contract.

Payment, Commission, Fees

The standard fee for architects in Tennessee is six per cent of the construction costs—four and one half per cent for drawings and specifications and one and one half per cent for supervision of project. Large projects may be completed for a fee less than six per cent. If additions or remodeling projects are involved a separate rate for each operation may be necessary. It is best to include the engineering fee as a part of the total fee so as to reduce the parties involved. If more than one contractor is involved, additional consideration should be given to compensate for coordinating the work of separate contractors.

When the extent of the work cannot be predetermined the fee plus cost system may be used to advantage. Under this plan the architect is paid for the preparation of drawings, engineering services, and other expenses, plus a fee for professional services.

Generally the payments to the architect are as follows: Twenty-five per cent based on a reasonable cost estimate after the preliminary drawings and outline specifications, fifty per cent or a sum sufficient to increase payment to seventy-five per cent upon completion of working drawings and specifications, and final payment based on actual cost at completion of the buildings.

It is the responsibility of the architect to issue certificates directing the board of education to pay the contractor. Materials used are generally paid for when they are incorporated into the building rather than when they are delivered to the project.

Project Supervision

Most school board members who have not been engaged in a building program may not clearly understand what the architect means by supervision. The architect may not take the time to explain what he proposes to do relative to supervision. In order for architects to be successful it is necessary for them to have some projects under construction, some in the planning stage, and still others on the drawing board. The supervision by the architect does not mean that someone will be on the job at all times, but means that enough supervision will be given to accomplish what they had expected to provide. It should be pointed out that if a board wants full time supervision it will be necessary to hire a clerk-of-the-works or increase the architect's fee and specify that they will give full time supervision. A clerk-of-the-works should have an understanding of working drawings as well as the techniques of construction. Even with a clerk-of-the-works the architect is still the only person who can give orders to the contractor. When the project has been completed the architect, contractor, superintendent and board of education should make a final inspection.

Ownership of Blueprints

When the final plans and specifications have been completed, one complete set should be bound and sealed and used only in case of a dispute. If change orders are required and issued someone must determine if there will be a difference in cost. A copy of all change orders must be given the school board.

The drawings and specifications are the property of the architect, but the architect should agree to file a copy of the drawings and specifications with the board of education at the end of the project.

Bidding and Awarding Contract

It is the responsibility of the architect to assist with bidding and awarding contracts. The time element is very important to the local people because at certain times more contractors are available for bidding and constructing projects; therefore, there is a better chance for a lower bid.

Usually five per cent of the bid submitted must accompany the bid in the form of a certified check. This is a guarantee that the successful bidder will accept the provisions established and proceed with the construction. If the contract is broken the board of education has a legal right to keep the check.

When the contract is signed, the contractor should be required to put up a 100% performance bond. By doing this he agrees to perform by building the project. The board should then return the certified check for the five per cent bid bond to the successful bidder.

It should be pointed out that if the board feels and has evidence to prove that the low bidder might not perform in a satisfactory manner they have the legal right to award the contract to the firm which submitted the next lowest bid. When the project has been completed the architect, contractor, superintendent, and board of education should make a final inspection of the building.

The final authority rests with the board of education and architect jointly according to the contract, with an obligation to comply with all local, state, and federal codes.

CHAPTER VIII

FINANCING THE BUILDING PROGRAM

Once it is determined that a school building program is needed and appropriate action is taken to initiate such a program, the system's financial plan for providing the facilities must be developed. Perhaps this phase of the building program creates more interest among the citizens within the school district than any other phase. Local citizens have a right to expect the building to last longer than the debt incurred. It is also reasonable to ask the generation which uses the building to help pay for it.

Procedures for obtaining finances for school building purposes are prescribed by law.

A brief summary of the ways to obtain money for a school building program is as follows:

1. The counties through their respective quarterly county courts are authorized to issue and sell bonds. Said bonds may be issued by the quarterly county court of any county by resolutions adopted by a majority of the members of said quarterly county court at any regular, special, or adjourned meeting thereof.
   In case of county wide bond issues, city school systems may participate in these funds in a ratio that the number of city students bears to the number of county students. (Tennessee Code Annotated, Official Edition 2, 49-701 through 49-720, as amended.)
2. Bonds may be issued in accordance with the County Recovery and Post War Aid Act of 1945.

   A simple majority of the governing body is required for approval to issue bonds. If at least 10% of the registered voters or those persons liable to be taxed sign a petition and file it with the clerk of the county testing the issuance of such bonds, a vote of the qualified people is necessary before bonds can be issued. Under this Act, bonds many be issued for periods not to exceed 40 years, and may bear interest at such rates not to exceed 5%. (Tennessee Code Annotated, Official Edition 9, and Addendum to 1962 Cumulative Supplement, Tennessee Code Annotated, Sec. 5-1101—5-1124).
3. The quarterly court or other governing body of a county is authorized to issue interest bearing capital outlay notes. These notes shall be executed for a period not to exceed three years. If any notes are not paid within the three-year period the unpaid balance shall be converted to bonds. (Addendum to 1962 Cumulative Supplement, Tennessee Code Annotated, Vol. 2, 5-1031—5-1038.)
4. Cities and consolidated school systems are authorized to issue bonds according to the provisions of Tennessee Code Annotated, Official Edition 2, Chapter 9, 6-901 through 6-923, Chapter 16, 6-1601 through 6-1631, and Chapter 23, 6-2301 through 6-2313. Chapter 23 refers to bonds issued under city manager charter.
   The charter of each city should be consulted for other possible provisions for issuing bonds.
5. Special school districts are permitted to issue bonds through special acts of the legislature.

A. Estimating the Funds Needed

Local citizens have a right to expect the superintendent and the board of education to inform them as to school plant needs and the probable cost of both the present and anticipated future projects.

Cost Factors Involved

Some factors to consider in school plant costs are: size of the project, construction cost levels, type construction, refinement and special features included, climatic conditions, subsoil factors, competition among contractors, availability of materials, water, sewers, labor, and the quality and scope of the project.

Estimating Cost

The cost per square foot has long been used as a basis for estimating the total building costs throughout the state; however, it is believed that the cubic foot costs, or per pupil costs are better and more reliable cost figures than the square foot cost. The type construction and other factors mentioned above tend to increase the difficulty of providing accurate advanced cost estimates. Cost estimates should not be made until after the preliminary drawings and outline specifications have been completed and it is known exactly what type materials will be used and amounts and types of labor needed for the project. The architect should then be able to make estimates with a rather high degree of validity. Local school systems should not ask for the appropriation of money for a project until the architect has presented an estimate of needs to the board of education.

Cautions to be Exercised in Estimating Costs

Local officials are often misinformed about school plant costs and the total picture is not presented in the initial estimate. Costs other than construction should be included. Other costs to consider are: equipment, furniture, landscaping, drives, walks, stadiums, floodlights, advertising, elections, supervisions, land, utility lines, as well as the architect's fee. Since the bond issue usually must cover all expenses it is imperative to know the total needs before asking for the necessary finances.

B. Setting up a Financing Program

Many local factors may be involved in determining the type financing program to follow. State laws are involved. The size of the project, local financial conditions and policies previously followed must be considered. A long-range financing program appears to be the most practical solution for any school system. This program should include funds which are anticipated from capital outlay such as taxes, property sales, bonds, state and/or federal aid if any. This program should show anticipated expenditures for debt service and for capital improvements.

A pay-as-you-go plan would be the most desirable method, but the plan is not possible for most school systems. Under this plan a system may build up a capital fund or may build from regular current tax funds. Most systems find it necessary to issue and sell bonds according to the needs. State capital outlay funds may be allocated to bonded debt retirement. It should be pointed out that not more than 50% of the state capital outlay funds should be used for debt retirement, leaving the other 50% for capital improvements.

Budgeting Project Expenses

The superintendent and board of education should be aware of all necessary expenses and should do the necessary advanced planning to be assured that there will not be a shortage of funds to complete the project. Legal fees, engineering fees, bond registration, surveys, grading and advertising costs are frequently overlooked in the total project.

Voting School Bonds

Some considerations by boards of education in preparing a bond program are as follows: basic information such as bonding capacity, assessed valuation, outstanding debt, board action showing minutes of meetings, attorneys reports showing the certification of authority, board resolutions for issuing bonds, court's approval of bond issues, bond attorney's approval of bonds, registration record of bonds, and approval by state or local officials.

Sale of Bonds

The sale of bonds should be timed to take advantage of the best interest rate possible. Other steps and procedures to be considered are: type of sale, sale conditions such as interest rate, dates of delivery, payment schedule, payments for bonds, and board liability.

Establishing Bond Payment and Debt Service Schedules

A bond payment and debt service schedule should be established so it will not create a hardship on the local citizens. The board of education should consider the existing bonded obligation and their maturity dates, the taxpaying ability of the system, the desires of the local taxpayers, and any future bond issues.

In setting the schedule it will be necessary to determine the type bonds to be sold, the term of bonds, such as 10, 15, 20, or 25 years, set a pay schedule, project estimates for debt service and estimate tax levies required. The bond records should be kept in a safe place so they can be referred to when paying bonds or planning the school budget.

CHAPTER IX

CONSTRUCTION

The contractor should not be omitted from the list of important parties involved in a school building program. When the final plans and specifications have been completed by the architect and approved by the Board of Education the contractor enters the program. The next step is to advertise for bids from contractors and prepare for the letting of contracts.

The architect is responsible for advertising for bids and working with contractors while preparing bids. He is responsible for performing according to the bid submitted, and the plans and specifications and is entitled to cooperation from the superintendent, board of education, and the architect.

Methods and Materials

The board is spending public money and should be concerned with precautionary measures to assures a wise expenditure.

Many construction features have not changed since early construction days; nevertheless, it is also true that changes in methods and materials have created a need for more careful construction procedures and practices than ever before. Today the thick walls have become thin curtain walls, the ceilings and roofs have been combined into one, and unless better workmanship is performed in waterproofing and sound control the result will be buildings which are not functional and which have high maintenance costs. Perhaps the moisture problem is one of the most critical conditions to cope with today.

Supervision of Construction

It is pointed out in chapter VII that the architect is responsible for the project supervision but that he will not be on the job every hour or even every day. Construction is usually carried on by workers who may not be too concerned about defects that arise, and by a contractor who made the lowest bid and must keep man hours and material costs to a minimum in order to stay in business. This makes it important that the board of education have a clerk-of-the-works employed full time. He should be familiar with modern construction techniques and should understand construction details. He should look for defective materials and workmanship that might be concealed before the architect gets back to the job. The clerk-of-the-works should have the ability to make decisions, to deal with contractors and should have some knowledge of administration and of construction records. Carefully planned and detailed working drawings, contractors selected according to law, continuous inspection, and good administration all help to insure a sound, and a relatively maintenance-free building.

Some Construction Objectives

A school building is designed to serve the needs of the educational program. Certain basic requirements must be met by the contractor both for the benefit of those who will use the building and the contractor. It should be suited to the original needs, it should be durable and strong, economical from a long-range view, and safe for occupancy.

The degree of future maintenance needs will depend largely upon how well the objectives of durability and strength are carried on in the construction of the building.

Architectural Documents for Contractor

After working drawings and specifications have been approved by the board of education, the architect will be ready to invite contractors to prepare bids on the projects. A copy of the working drawings and specifications should be placed in the hands of each contractor who wishes to bid on the project.

The working drawings should contain (1) the plot plan, (2) floor plan, (3) elevations, (4) sections, (5) plumbing plan, (6) electrical plan, (7) heating and ventilation plan, (8) details, (9) door and window schedule, and (10) finish schedule.

The specifications are for the purpose of describing the materials, equipment and methods used in the construction. All materials, including such items as plumbing fixtures, light fixtures, grades of tile, chalkboard colors, are shown on the specifications to be used as a guide in preparing bids to be submitted.

Certain other information such as building ordinances, permits, inspections of work, claims for extra costs, methods of payments, forms of insurance, claims for damages, right of the various parties to stop work, and various supplementary general conditions such as temporary heat connections, or temporary enclosures must be clearly defined.

Bidding and Letting Contracts

The school attorney should be responsible for advising the board of education and the superintendent on matters concerning advertising for bids, contracts, change orders, payments, and negotiations. The architect is responsible for preparing and presenting plans and specifications for approval by the board, and should work with the contractor in interpreting plans. It is the responsibility of the board of education to decide whether to let a general contract or a separate contract. When two or more projects are ready for bidding at the same time savings may be effected by asking for bids on the individual projects and as a group.

Time Allowed for Preparing Bids

If contractors are not given a sufficient amount of time for preparing bids the result is likely to be large allowances for contingencies, and excessive costs for the project. At least two weeks should be allowed on any project, and three or even four weeks on major projects. The architect should encourage well-known, reliable contractors from a wide area to participate in the project. This not only increases chances for minimum bids but makes it less likely that collusion will take place.

The bids are usually opened in a board meeting and tabulated by the architect. After all bids have been opened and the architect has verified the low bid with the plans and specifications, the successful bidder may be announced.

Contractor's Responsibility for Bidding

When the instructions have been given the contractor it is time to begin the building operation. The board of education and the superintendent should understand their role as well as the relationships between them, the architect and the contractor. They should work through the architect at all times to avoid confusion in instructions.

Completion and Acceptance

The rubbish piles should be removed, landscaping completed, and the final touching-up and adjustments made before furniture or pupils are brought into the building. This will prevent disputes over damages caused while installing furniture. The date of completion is important and should be recorded. The final inspection should be done in the presence of the superintendent, board of education, architect, and contractor.

Operating instructions for mechanical equipment should be given those who are to use the buildings.

A contractor should meet the requirements of paragraphs 682 through 688 of public school laws of Tennessee 1961, or Tennessee Code Annotated, Official Edition 11, Chapter 2, 62-602, 62-614, and Official Edition 3, Chapter 4, 12-414, 12-417, 12-418, 12-420, and 12-422.

CHAPTER X

LEGAL AUTHORITY—PROBLEMS AND SERVICES

A. Some Major Legal Problems

State and local laws are present throughout the entire process of the school building program. Clearing of titles, legal transfer of titles to sites, and public notices, or authorizations may be necessary in the financing program.

Providing Legal Services

Most counties retain the services of a county attorney. City and special districts may have a city or a school attorney. It may result in a savings to the school system to also secure the services of a bonding attorney.

There are many legal problems involved in a building program and only an attorney may have the correct answer. Some of these problems are: School board authority for entering contracts, protecting board interests in contracts, rendering services, provisions for payment, authority of the school board concerning the sale and purchase of real property, and local and state requirements concerning land purchase.

The legal advisor can interpret laws concerning powers or limitations relative to bond issues or sales, borrowing, state or federal aid for financing school programs, liabilities, engaging and paying for services, and requirements for approval of plans and specifications.

B. Retaining Legal Councel

The school attorney may be able to provide most of the legal advice within the limitations of the established retainer fee. However, if large projects are initiated a definite sum in addition to the regular fee may be agreed upon for such service.

If the school attorney is unable to provide the needed legal counsel he may suggest a competent person to consider. If the project is large enough to justify such expenditure a bond attorney should be engaged.

C. Responsibilities of the School Attorney

1. *Legal contracts*

   The school attorney may be involved in site acquisition, contracts, transfer of titles, legal conflicts, etc. He must carefully study all contracts with architects and contractors to prevent future problems of misunderstanding. The architect is responsible for specifications for construction contracts, for preparing the advertisements for bids, and for advising the school board on bids and contractors. It is imperative that the attorney examine all contracts and forms of agreement to protect the board of education.

2. *Agreements between board of education and professional personnel*

   It is sound business to draw up agreements between the board of education and consultants, architects, engineers, and surveyors. A more complete project with better workmanship may be the result. All agreements should be clearly stated as to responsibilities, type services to be rendered, length of time involved, results expected, and fee to be paid.

All records and reports of board meetings, decisions made, special authority granted, and reports and documents should be recorded and carefully guarded throughout the building program. All correspondence, applications, plans, estimates, recommendations, and decisions should be kept on file to help protect the interest of the local officials and the school system.

Bond Attorney

It is generally agreed that the major function of the bond attorney is to determine the legality of the bond issue. The standing of the bond attorney may help to get a good bid on bonds. His certification may help to get a low interest rate.

The bond attorney should help prepare a debt service plan, prepare notices of meetings, advertisements, and establish records of results.

CHAPTER XI

PLANNING, SELECTING, AND PURCHASING FURNITURE AND EQUIPMENT

A. Planning the Equipment Program

1. *Staff responsibility*

The furniture and equipment needs for a school building should be established and defined by the superintendent, his supervisory staff and the teachers when the activities are identified for each area of the building.

"School furniture and equipment are essential tools of the educational program. The building and the faculty cannot contribute fully to the education of pupils without these tools for education and for living in the school home. Equipment and furniture planning should be done along with the building planning, and funds should be allocated and reserved for such purpose."[7]

The trend is toward the design and use of built-in furniture and equipment. Caution must be exercised to see that a practical approach is utilized and not permit architects to design equipment or furniture that is not functional and reasonable in cost.

2. *Planning procedures*

The first step should be a written description of the program of the school. This description should include the functions of each space, the activities to be carried on and the relationships of all spaces. The fixed equipment and movable furniture should be designated for each area. Even though the architect may not be asked to select or design the equipment he needs to know the dimensions required and the electrical, gas, and water connections needed, as well as drains required. The architect may be asked to provide all fixed equipment such as folding bleachers, kitchen equipment, laboratory tables, etc.

The architect may then prepare a schematic which serves to interpret the written descriptions. This will serve as a guide in discussing the layout with the school officials.

When a final decision has been made as to the type and arrangement of furniture and equipment, and the architect has made a final drawing of the room layout, written specifications for the furniture and equipment should be prepared. The specifications should not restrict competetive bidding. Even though the architect may be asked to provide a schematic showing layout of all areas, the board should not let the equipment become a part of the contract with the architect. This will allow the board of education to save architect's fee on equipment costs.

3. *Preparation of budget for equipment*

A detailed list of equipment should be prepared. This list may be prepared in such a way as to show the existing equipment as well as the new equipment to be purchased. If none exists, two columns will not be necessary. The estimated unit cost should be shown. The unit cost should then be converted to total cost. This total cost will become a part of the total budget for the new school and should serve as an aid in securing the furniture and equipment necessary to conduct a good school program.

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[7] United States Department of Health, Education, and Welfare, *Local School Construction Programs:* Bulletin No. 20. (Washington: Government Printing Office, 1957), p. 36.

B. Criteria for Selecting Equipment

1. *Bases of selection*

Consideration must be given to the type of school—primary, elementary, secondary, and the age and size of pupils. Consider the type program to be housed, range of subjects, number of students per area, and grouping requirements. Determine the teaching methods—lecture, demonstration, laboratory. Furniture and equipment finish, durability and cost must be taken into consideration. The furniture and equipment must meet the needs of the program and should be as free from hazards as possible.

2. *Early selection as part of overall planning*

Early selection permits complete layout of all areas, electrical outleys, connections, roughing in for plumbing, etc. Early selection permits establishment of cost figures for total budget, allows time for greater selectivity, prevents overcrowding of spaces or a possible allowance of excessive space.

3. *Selection procedure*

Selection should be based on needs, detailed specifications, catalog descriptions and experience with various types of furniture and equipment. Some considerations in selection are: The selection of both electric and gas equipment, (for example) home appliances, the use of different kinds of typewriters, and the types of laboratory furniture to select.

C. Purchasing Schedules and Procedures

Every manufacturer who is considered acceptable should be given an opportunity to participate in the bidding. Usually three weeks is considered a sufficient amount of time to prepare bids.

Specifications should clearly indicate what items will or will not be acceptable to simplify bidding and reduce time required during bid openings.

Bids for fixed equipment should be received as soon as possible after the construction contract has been let. Bids for movable furniture should not be received until it is determined approximately when the building will be ready to accommodate it. Five or six months should be a sufficient amount of time.

A master chart showing the furniture and equipment layout should be provided to simplify the placement procedure.

When the furniture and equipment have been placed in the respective areas, the superintendent and board of education or a designated representative should inspect each area and approve or reject it.

D. Preparing List of Equipment

A prepared list of equipment, by types, and according to areas of needs may prove to be helpful to teachers in planning. A brief description and a catalog number may also be helpful. The list should be as complete as possible for each area. An example of the list is as follows:

1. General items such as lockers, window shades or blinds, chairs, or pencil sharpeners.
2. Classrooms—seating, teachers desks, cabinets, if not built in.
3. Science rooms—seating, demonstration desk, laboratory tables, equipment for experiments.
4. Home economics—tables, stoves, refrigerators, washing machines, clothes driers, sewing machines, tote trays, wardrobes, etc.
5. Cafeteria—kitchen equipment—peelers, dishwashers, mixer, refrigerator, stoves, preparation tables, etc.

CHAPTER XII

HEATING AND VENTILATION

Parents have a right to expect their children to be housed in buildings which provide an environment conducive to the best possible learning conditions. Heating and ventilating systems are costly items and caution should be exercised in order to provide only those systems that will provide thermal and atmospheric conditions necessary for health and bodily comfort.

A. Heating and Ventilating Objectives

"Studies show that the quality of the thermal environment in the classroom—that condition of the air and surrounding surfaces which affects the physical and mental comfort of the student—can affect the ability of the student to grasp instruction. Studies show that both working and learning efficiency decreased with departure from the optimum. If the student is too cold he will be distracted; and if he is too warm he will be sleepy and unattentive. An uncomfortable thermal environment may be fatiguing and distracting to the student; therefore, the maintenance of the proper thermal environment is an important factor in the most productive use of teaching time."[8]

Environmental factors which affect body comfort are: air temperature, relative humidity, radiant temperature, and air movement. The temperature required for various spaces will depend upon the activities conducted in the spaces. Popular classrooms and laboratories should maintain a temperature from 68 to 72 degrees. In areas such as corridors where moderate activity takes place the temperature should be from 65 to 70 degrees. Shower and locker rooms should be maintained at 80 degrees or slightly higher. Areas designed and used for physical education and all toilet rooms should not be over 65 degrees in temperature. Heating and ventilating authorities have agreed that air movement is essential. Stagnant air will not provide the comfort needed.

B. Types of Heating and Ventilating Systems

Heating systems range from the individual room heater to the automatic system which maintains a predetermined thermostatically controlled temperature in each area of the school building. Ventilating systems vary from the mechanical systems with air movement to the open window. School superintendents and boards of education should consult a mechanical engineer before making a decision concerning the type system to install. The original cost, operating cost, maintenance personnel available, and the size of the plant may be determining factors in the final decision.

C. Heating Controls

Temperature controls which make it possible for every area to be independently regulated are very essential for the best possible results. The controls may be for individual rooms, zone controls, day controls, or night controls. Zone controls appear to have some merit relative to economy of operation; however, individual room controls are the most effective and desirable because of the location of rooms with relation to the sun, variable room loads and varying activities carried on in the areas. Night controls make it possible to maintain a lower temperature while the building is not occupied.

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[8] National Council on Schoolhouse Construction, *Op. Cit.*, p. 170.

D. Mechanical Operating Instructions

School systems which install mechanical ventilating and/or air conditioning equipment should also provide a trained maintenance and custodial staff to maintain the equipment so it will function properly.

The board of education should see that those who have been assigned to maintain the equipment are given complete instructions for operating and maintaining the equipment. A complete set of written instructions should be presented to the board for use by the maintenance supervisor.

E. Fuels to Use

Coal, gas, and electricity are the major fuels used. The most satisfactory and most appropriate fuel to use will depend largely upon the area of the state as well as the kind of heating or ventilating system installed. All state laws must be observed relative to installation of equipment and use of fuel.

All space in school buildings shall be designed for natural ventilation, or gravity ventilation, or mechanical ventilation, or a combination of these methods. Classrooms shall be designed with vents or breeze windows in the corridor wall. Open flame space heaters shall not be used in classrooms. When gas heaters are used in classrooms such heaters shall be provided with air for combustion taken from the outside of the classroom. Gas heaters shall be of a vented type connected to an effective chimney or gas vent which shall extend above the eaves or parapet walls at least 18 inches.[9]

F. Methods of Ventilating

1. *Window or natural ventilation*

This method is the least expensive. For window ventilation to be effective, breeze windows must be provided on the corridor or inside walls. The inside openings must be as large as the intake area and both areas should be as large as possible. The greatest air speed is present when the breeze windows are larger than the outside windows. This method is not necessary when mechanical ventilation or air conditioning is installed.

2. *Mechanical exhaust*

This method pulls air from the rooms to the outside. This may be an advantage over natural ventilation but there may be uneven ventilation of areas.

3. *Mechanical ventilation*

With mechanical ventilation fresh air can be brought into the room, circulated, and stale air moved out. This method may work through ducts from a central system or by individual room fans within the system. Recirculation of room air is possible by this method. The mechanical plan will work effectively so long as the outside air is cooler than the air within the room.

4. *Air conditioning*

Air conditioning, the most recent addition to the mechanical phase of school buildings, is the most effective means for providing the thermal environment and bodily comfort essential for the greatest productivity by the teachers and students. By designing compact buildings, many systems are able to include air conditioning with little or no additional cost above the existing conventional buildings.

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[9] 1963-1965 Rules, Regulations, and Minimum Standards, *Op. Cit.*, p. 75.

CHAPTER XIII

LIGHTING

A. Importance of Good Visual Conditions

Visual comfort, like comfort resulting from good thermal environment and correct room temperature, is essential for the best possible learning conditions. Children spend many hours each day involved in critical seeing which involves focusing the eyes upon a visual task. Reading, writing, drawing, painting or working with tools all require visual comfort to prevent fatigue, tension, or behavior problems.

To achieve the desired visual objectives requires certain basic understandings of fenestration, interior finishes and artificial lighting.

B. Intensity of Light

"One of the basic factors in providing a good visual environment is intensity of light. This is the amount of light falling on a given surface and is measured in foot candles."[10] The 1963-65 Rules, Regulations, and Minimum Standards requires at least 30 foot candles of light on each desk top in a classroom. An even distribution of light is essential to a good visual environment.

C. Brightness

Brightness is related to intensity, but is somewhat different. "Brightness is the amount of light emitted by or reflected from a surface and is measured in foot lamberts."[11]

The relationship between intensity and brightness may be expressed as follows: Foot candles x reflection factor=foot lamberts.

D. Brightness Goals

The 1963-65 Rules, Regulations, and Minimum Standards of the Tennessee State Board of Education recommended the following brightness differences in classrooms.

Ceilings—finish flat with at least 85% reflectance
Walls—finish flat with at least 50 to 70% reflectance
Wainscote—same as walls, or slightly darker with flat or semi-gloss
Trim—natural flat or semi-gloss 35 to 60% reflectance
Floors and furniture—natural without stain
Chalkboard—not less than 15% reflectance factor

E. Types and Patterns of Light Fixtures

A well designed lighting system may do much to accomplish the desired visual comfort and efficiency of students. Before selecting light fixtures contact your architect and engineer and discuss the merits of each type fixture with them. The two major types are briefly discussed in the following paragraphs.

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[10] John H. Herrick and others, *From School Program to School Plant* (New York: Henry Holt and Company, 1956), p. 416.
[11] Ibid. p. 417.

1. *Incandescent fixtures*

Incandescent fixtures are usually arranged in rows which should run parallel to the window wall. The row which is the greatest distance from any natural light should be on a separate switch so it can be turned on to supplement natural light.

The source of light should be concealed from view, thus making it indirect light.

More heat is given off by incandescent fixtures than by fluorescent fixtures.

2. *Fluorescent fixtures*

Fluorescent tubes should be shielded from normal view. Because fluorescent lighting does not produce as much heat as incandescent lighting the State Board Rules and Regulations permit classroom ceilings to be reduced from a minimum of ten feet to nine feet in height. Fluorescent fixtures are probably more expensive to install as well as to maintain; however, incandescent lighting consumes from two to two and one-half times more electricity than is consumed by fluorescent lighting. Where T.V.A. electricity is available this difference may not be of major significance.

F. Use and Control of Daylight

The problem of providing a sufficient amount of daylight in classrooms to accomplish the desired visual goals has long been a concern of school officials.

1. *Use of daylight*

With improved methods of lighting, daylight should no longer be considered the prime source of supply. New innovations in school building design have relieved school people of many light and light control problems.

The complex problem of providing and controling daylight along with the improved methods of providing artificial lighting has led many school people to the conclusion that less natural light and a greater reliance upon artificial lighting is essential to the best possible visual results.

2. *Clerestory lighting*

If clerestory lighting is used the fenestration should be continuous to avoid light and dark areas in the room, and some provisions should be made to control the light. Clerestory lighting is still used on interior areas which require high ceilings. This enables the provision of some natural light even though the lower part of the room is completely surrounded.

3. *Bilateral lighting*

Bilateral lighting resulted from a desire to get more light into the corridor side of the classrooms and to get greater use of corridors. The increased awareness that better lighting conditions are possible through the use of artificial lighting with restricted natural light has eliminated the need for bilateral light in classrooms.

4. *External and internal control devices*

Many forms of external devices have been used in an effort to shield bright sunlight from the rooms. Some of these are: overhang of the roof, and horizontal louvers or vertical louvers. The roof overhang serves to protect the building from the weather whether it be rain, snow, or sunshine. Louvers are sometimes used to protect classrooms from bright sunshine as well as to provide an architectural or aesthetic appearance.

Some internal control devices are: translucent fabric shades on spring rollers, venetian blinds, and translucent draperies. With the increased emphasis on less window area, the need for control devices is not as great.

5. *Skylights*

Skylights are not recommended for two reasons:

(1) In the past it has been virtually impossible to prevent leaking.

(2) It is very difficult to control the light which enters through the skylights.

The trend is toward an improved visual environment by a reduction in window space for providing natural light, and an increase in artificial light.

CHAPTER XIV

INSURANCE

A. Nature, Purpose, and Principles of Insurance

In many school districts the investment in school buildings represents a large share of the total wealth of the district. It is imperative that the school board provide protection for the school district through the purchase of insurance.

1. *Purpose of insurance*

Insurance is for the purpose of assuring the school board and the citizens of a school district that the premium paid for the insurance protects them against hazards in the amount of the coverage. Property insurance may be secured by the board for this purpose. The protection may be against loss of property or damage caused by fire, windstorm, hail, theft, burglary, or other hazards.

2. *Basic principles of school insurance*

The school insurance program is designed to: (1) protect the investment in school buildings and equipment, (2) secure the protection needed by the district, and (3) relate school property protection to student and school employee protection by removing any hazards which endanger the property and the life and safety of both students and employees.

Insurance is not to be used for profit making. Sound insurance practices will (1) distribute the risk, (2) protect the risk and obligation of the school system, (3) provide maximum protection at a minimum cost, and (4) provide coverage commensurate with the risk involved.

B. Areas of School Insurance Coverage

Protection should be of (1) the physical properties, tangible assets, and credits as well as (2) against claims of liability. The first of these includes existing building and equipment, buildings under construction, glass, property subject to burglary, etc. The second includes personal liability and property damage liability.

1. *Builder's risk*

This form of insurance is for protection during the construction stage of a building. The building should be insured for 100% of contract cost of the building. Unless otherwise indicated this policy should terminate at the completion of the project.

2. *Boiler and machinery*

Boiler and machinery insurance protects against loss by explosion and breakdown of machinery such as engines, pumps, compressors, etc.

3. *Glass*

The large amount of glass in school buildings has brought about the need for glass breakage coverage to protect the district from accidental or malicious breakage of glass.

4. *Surety*

Surety coverage is divided into two categories: (1) fidelity and (2) performance and contract coverage. Fidelity coverage protects the school system against loss caused by the dishonest or fraudulent acts of school district employees and may be secured by the purchase of fidelity bonds. Performance coverage is insurance against loss caused by debts or delivery of supplies or equipment.

C. Suggested Types of Insurance Coverage

1. *Institutional plan*

This plan is designed for institutional property and provides the following:

a. Broad protection for buildings

b. Coverage on contents of buildings and playground equipment, flagpoles, fences, etc.

c. Eliminates the co-insurance clause.

d. Provides for annual inspection by fire inspection engineers. Owners must make quarterly fire prevention inspection.

e. Provides for annual adjustment to prevent being over-insured or under-insured.

f. Provides coverage on newly completed buildings up to 180 days days in the amount of 5% of total amount of insurance carried or $100,000.00, whichever is the smallest amount.

g. If buildings are insured at 100% of value the total cost of replacement without any deduction for depreciation will be paid. Since the institutional plan is designed for a specific class of insured risk, the plan provides for a number of administration savings that are passed on to the owners.

2. *Co-insurance*

Co-insurance is a clause in the insurance policy which indicates that the property owner agrees to carry insurance up to a predetermined percentage of the total current value of the property. The greatest advantage of the co-insurance is that the owner is able to secure cheaper insurance rates because he agrees to maintain a certain percentage of insurance on the property. Under this clause all buildings covered must be appraised every year to keep the percentage of co-insurance up to current values.

Buildings may be insured for 50%, 60%, 70%, 80%, 90%, or 100% co-insurance based on the value of property at the time of the loss, but the most frequently used appears to be the 80% clause. In the event the required amount of insurance is not kept in force and a loss occurs only the fractional part will be paid which bears the ratio that the coverage bears to the amount the coverage should have been.

D. Authority of School Boards to Purchase Insurance

Certain legal responsibilities have been prescribed for local boards of education. The protection of school property is an obligation which must be assumed by the board.

1. *Legal basis for authority*

   The state and local legal machinery provides that boards of education have an obligation to purchase sites, construct buildings, provide equipment needed, and protect the property of school districts.

2. *Developing school board policies*

   Definite and complete policies must be developed concerning the protection of property. Such factors as distribution of risk, replacement factors, community attitudes and purpose of coverage should be considered. A study should be made of the financial condition of the school district to determine the types of risks, extent of each, and whether district can afford the risks.

E. Developing Local School Insurance Program

1. *Placing responsibility for the program*

   The superintendent has a responsibility to carry out the board's policies concerning the insurance program. The board may appoint a person to manage the insurance program, may appoint local agent to advise, or a committee of insurance people may work with the superintendent or the designated representative of the board of education.

2. *Designating risks to be covered*

   The board should give consideration to determining the risks involved and protection needed. Data such as insurance costs and losses within the district should be secured, the rate patterns should be studied. The nature of losses within a district may largely determine the type coverage needed.

3. *Determining amounts of coverage*

   It is very difficult to determine the necessary amount of coverage; however, the following factors should be taken into consideration: (a) insurable values, (b) local policy, (c) financial ability, and (d) legal requirements.

   (a) Insurable values—The insurance company should not have to pay more than the cost to restore the building to the condition before the damage.

   (b) Appraisals—School building appraisals may depend upon local policy. An insurance program should be based on appraisals by qualified personnel.

   (c) Inventories—The inventory results may be closely related to results from appraisals; however, an inventory of the contents of all buildings should be carefully made and retained for future use. A perpetual record of building contents is essential, but it must be kept in mind that the equipment depreciates faster than the building. The inventory should include a detailed list of equipment, the age, quantity, cost, and condition of each piece.

   (d) Legal requirements—State and local laws should be observed in determining the amount and types of insurance coverage.

CHAPTER XV

RULES, REGULATIONS, AND MINIMUM STANDARDS TENNESSEE STATE BOARD OF EDUCATION

AND

PUBLIC SCHOOL LAWS OF TENNESSEE

RULES, REGULATIONS, AND MINIMUM STANDARDS

Chapter 39, Section 15 of the 1963 Public School Laws of Tennessee authorizes the State Board of Education to establish minimum standards for school plants as follows.

"The State Board of Education is hereby authorized to establish minimum standards for school sites, school attendance centers, the construction of buildings for school purposes, the major repairs of buildings for school purposes of a capital outlay nature, and for equipment for buildings for school purposes. No county, city, or special school district board of education shall obligate or expend any State or local school funds for any project of a capital outlay nature which does not conform to the standards adopted by the State Board of Education as authorized in this paragraph.

The State Board of Education is hereby authorized and directed to establish minimum standards for school sites and buildings for the approval of schools."

Part III of the current Rules and Regulations, 1963-65, governs new sites, new buildings, major repairs, and equipment for schools.

SectionC-1 of the Rules and Regulations is that part which is concerned with the review and approval of plans and specifications. It is as follows:

Plans—Review and Approval

"The Commissioner of Education shall approve all plans and specifications for construction. The preliminary plan shall show possibilities of flexibility and future expansion, and a map of the site showing the proposed location of the building shall be a part of the preliminary plan. In order that the State Commissioner of Education may determine whether minimum school building standards are being met, the following procedures shall be followed:

a. Approval of preliminary plans and outline specifications.

b. Approval of final plans and complete specifications including alternates. The final plans and complete specifications must be approved by the State Commissioner of Education prior to the advertisement for bids.

c. Approval of all change orders which affect space allotment, structure, or health and safety prior to the time contractors are advised to make changes.

d. The superintendent of schools shall be responsible for submitting plans and specifications to the State Commissioner of Education for approval."

The Rules and Regulations are revised and reprinted every two years. Therefore, all of Part III is not included in this manual. School superintendents and other local school officials engaged in school plant planning should be familiar with the current Rules and Regulations and see that the minimum requirements are met before plans and specifications are submitted to the School Plant Division of the State Department of Education.

PUBLIC SCHOOL LAWS

Some of the major public school laws are referred to in the various chapters of this manual. For the convenience of local school officials these same references to the school laws are repeated as follows:

Laws Governing Architectural and Engineering Services

Refer to Chapter 46, Paragraph 681 of Public School Laws of Tennessee 1961, or Tennessee Code Annotated, Official Edition 11, Chapter 2, 62-222.

Laws Governing Contractural Services

Refer to Chapter 46, Paragraphs 682 through 688 of Public School Laws of Tennessee 1961, or Tennessee Code Annotated, Official Edition 11, Chapter 2, 62-602, 62-614, and Official Edition 3, Chapter 4, 12-414, 12-417, 12-418, 12-420, and 12-422.

Laws Governing the Financing of the Building Program

Counties through their respective quarterly county courts are authorized to issue bonds in accordance with Chapter 12 of Public School Laws of Tennessee, 1961, or Tennessee Code Annotated, Official Edition 2, 49-701 through 49-720, as amended.

Bonds may be issued in accordance with the County Recovery and Post War Aid Act of 1945. (Tennessee Code Annotated, Official Edition 9, and Addendum to 1962 Cumulative Supplement, Tennessee Code Annotated, Section 5-1101 through 5-1124).

Interest bearing capital outlay notes may be issued according to (Addendum to 1962 Cumulative Supplement, Tennessee Code Annotated, Vol. 2, 5-1031 through 5-1038).

Cities and consolidated school systems are authorized to issue bonds according to the provisions of Tennessee Code Annotated, Official Edition 2, Chapter 9, 6-901 through 6-923, Chapter 16, 6-1601 through 6-1631, and Chapter 23, 6-2301 through 6-2313. Chapter 23 refers to bonds issued under city manager charter.

Special school districts are permitted to issue bonds through special acts of the legislature.

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